

#### CLAIMS

1. A colloidal solution preparing method for forming colloidal particles by boiling a solution containing a metal salt and a reducing agent,  
wherein the concentration of the metal salt in said solution is  $1 \times 10^{-4}$  mol/L or more and less than  $4 \times 10^{-4}$  mol/L; the equivalent concentration of the reducing agent is four times or more and 20 times or less the equivalent concentration of the metal salt; and the reaction time is 60 minutes or more and 300 minutes or less.
2. A colloidal solution preparing method for forming colloidal particles by boiling a solution containing a metal salt and a reducing agent,  
wherein the concentration of the metal salt in said solution is  $4 \times 10^{-4}$  mol/L or more and less than  $6 \times 10^{-4}$  mol/L; the equivalent concentration of the reducing agent in four times or more and 20 times or less the equivalent concentration of the metal salt; and the reaction time is 30 minutes or more and 150 minutes or less.
3. A colloidal solution preparing method for forming colloidal particles by boiling a solution containing a metal salt and a reducing agent,  
wherein the concentration of the metal salt in said solution is  $6 \times 10^{-4}$  mol/L or more and  $15 \times 10^{-4}$  mol/L or less; the equivalent concentration of the reducing agent in four times or more and 20 times or less the equivalent concentration of the metal salt; and the reaction time is 30 minutes or more and 90 minutes or less.
4. A colloidal solution preparing method for forming colloidal particles by boiling a solution containing a metal salt and a reducing agent,  
wherein the concentration of the metal salt in said solution is  $4 \times 10^{-4}$  mol/L or more and less than  $6 \times 10^{-4}$  mol/L; the equivalent concentration of the reducing agent in twice or more and less than four times the equivalent concentration of the metal salt; and the reaction time is 60 minutes or more and 120 minutes or less.
5. A colloidal solution preparing method for forming colloidal particles by boiling a solution containing a metal salt and a reducing agent,

wherein the concentration of the metal salt in said solution is  $6 \times 10^{-4}$  mol/L or more and  $15 \times 10^{-4}$  mol/L or less; the equivalent concentration of the reducing agent in twice or more and less than four times the equivalent concentration of the metal salt; and the reaction time is 30 minutes or more and 240 minutes or less.

6. A colloidal solution preparing method for forming colloidal particles by boiling a solution containing a metal salt and a reducing agent,

wherein the concentration of the metal salt in said solution is  $4 \times 10^{-4}$  mol/L or more and less than  $6 \times 10^{-4}$  mol/L; the equivalent concentration of the reducing agent is once or more and less than twice the equivalent concentration of the metal salt; and the reaction time is 60 minutes or more and 120 minutes or less.

7. A colloidal solution preparing method for forming colloidal particles by boiling a solution containing a metal salt and a reducing agent,

wherein the concentration of the metal salt in said solution is  $6 \times 10^{-4}$  mol/L or more and  $15 \times 10^{-4}$  mol/L or less; the equivalent concentration of the reducing agent in once or more and less than twice the equivalent concentration of the metal salt; and the reaction time is 30 minutes or more and 120 minutes or less.

8. The colloidal solution preparing method according to any one of claims 1 to 7 wherein said reducing agent is a citrate.

9. The colloidal solution preparing method according to any one of claims 1 to 8 wherein the average particle diameter of said colloidal particles is 1.6 to 5 nm.

10. A carrier wherein colloidal particles are fixed on the surface of a substrate by applying the colloidal solution prepared by the method according to any one of claims 1 to 9.

11. The carrier according to claim 10 wherein said substrate is glass fiber or scale-like glass.

12. The carrier according to claim 10 or 11 wherein said substrate is porous.

13. A method for manufacturing a fuel cell cathode wherein a colloidal solution prepared in the state wherein a solution containing a metal salt and a reducing agent

is boiled to remove dissolved oxygen is applied to a substrate, and colloidal particles are fixed on said substrate.

14. The method for manufacturing a fuel cell cathode according to claim 13, wherein said metal salt is chloroplatinic acid.
15. The method for manufacturing a fuel cell cathode according to claim 13 or 14, wherein said reducing agent is sodium citrate.
16. The method for manufacturing a fuel cell cathode according to any one of claims 13 to 15, wherein the average particle diameter of said colloidal particles is 1.6 to 5 nm.
17. A fuel cell cathode manufactured using the method according to any one of claims 13 to 16.
18. A fuel cell using the cathode according to claim 17.
19. A method for manufacturing a fuel cell anode wherein a colloidal solution prepared in the state wherein a solution containing a metal salt and a reducing agent is boiled to remove dissolved oxygen is applied to a substrate, and colloidal particles are fixed on said substrate.
20. The method for manufacturing a fuel cell anode according to claim 19, wherein said metal salt is chloroplatinic acid.
21. The method for manufacturing a fuel cell anode according to claim 19 or 20, wherein said reducing agent is sodium citrate.
22. The method for manufacturing a fuel cell anode according to any one of claims 19 to 21, wherein the average particle diameter of said colloidal particles is 1.6 to 5 nm.
23. A fuel cell anode manufactured using the method according to any one of claims 19 to 22.
24. A fuel cell using the anode according to claim 23.
25. A method for preparing a low-temperature oxidation catalyst wherein a colloidal solution prepared in the state wherein a solution containing a metal salt and

- a reducing agent is boiled to remove dissolved oxygen is applied to a substrate, and colloidal particles are fixed on said substrate.
26. The method for preparing a low-temperature oxidation catalyst according to claim 25 wherein said metal salt is chloroplatinic acid.
27. The method for preparing a low-temperature oxidation catalyst according to claim 25 or 26 wherein said reducing agent is sodium citrate.
28. The method for preparing a low-temperature oxidation catalyst according to any one of claims 25 to 27, wherein the average particle diameter of said colloidal particles is 1.6 to 5 nm.
29. A low-temperature oxidation catalyst prepared using the method according to any one of claims 25 to 28.
30. A fuel modifying device for a fuel cell using the low-temperature oxidation catalyst according to claim 29.